

CRYSTOBSERVER PROVES ITS WORTH IN IMPROVING RAW SUGAR QUALITY

During a number of crystallisation stages in the factory, raw sugar crystals are grown from a minute size to about 0.9 mm.

The first stage produces crystals from finely ground sugar particles, which are typically 8 microns (0.008 mm) in size. By comparison, the diameter of a human hair can be as large as 70 microns (0.07 mm). This phase is known as the 'graining step'.

These crystals are then grown to a size of about 0.18 mm in a step known as C seed production. This is an important stage in raw sugar manufacture because the number and average size of the crystals produced influence both the quality of the final product and the quantity of sugar recovered by the factory.

"In Australian raw sugar production there has previously been no way of monitoring the development of these small crystals, other than by the pan stage operator taking proof samples from the pan and examining the samples for number and size under a microscope,"

QUT Research Fellow Gabriel Fraga said.

"Clearly, there is room for efficiency improvements in this process step. Tighter control of C seed production can improve sugar recovery, sugar quality, and pan stage throughput. It can also decrease steam and water consumption."

An improved method is now available following the completion of an SRA-funded project undertaken by Sunshine Sugar working with researchers at QUT. The project trialled an innovative microscope system called Crystobserver, which was installed in the C seed pan at Condong Mill in northern New South Wales to monitor the crystal development in real time.

"Crystobserver is an online High Definition (HD) video microscope that offers high resolution quality images of crystals. It is capable of measuring crystals as small as 30 microns in size," QUT's Prof. Ross Broadfoot said.

The Crystobserver is produced by ITECA, a company based in France which designs

and manufactures systems that can be integrated into sugar, cement, quarrying and mining processes to provide online images and data to provide improved production efficiencies.

"The Crystobserver has previously been used in beet sugar production in Europe. However, as far as we know, this is the first time it has been tested in a mill processing sugarcane, and in particular in the highly coloured molasses that is present in C seed production in Australian sugar mills," Sunshine Sugar's Business Diversification Officer Kent Selby said.

"The Crystobserver was installed, commissioned and calibrated by the mill's instrumentation staff, with remote guidance from ITECA technicians," Condong Mill's Lead Process Engineer Ashley Curran said.

"The software outputs were integrated into the mill's Distributed Control System (DCS) which includes alarms that go off if the process deviates from certain limits.

Using the Crystobserver, Condong Mill's Lead Process Engineer Ashley Curran can monitor the development of sugar crystals on the computer.

A Crystobserver image of sugar crystals in the C seed production at Condong Mill.



